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**(54) Guidewire insertion aid**

Einführungshilfe für Führungsdrift

## Aide d'introduction pour fil de guidage

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(56) References cited:

**EP-A- 0 328 760**      **WO-A-96/02294**  
**FR-A- 1 534 122**      **GB-A- 2 180 454**  
**US-A- 4 838 880**      **US-A- 5 320 613**

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## Description

[0001] The invention relates to an insertion aid to facilitate insertion of the proximal end of a guidewire into the distal end of a catheter as defined in the precharacterizing part of claim 1.

[0002] When a patient is subjected to a vascular treatment necessitating employment of a catheter, a guide catheter is first inserted into the vessel in which the catheter is to be employed, after which a guidewire is introduced in this guide catheter. Via this guidewire the actual treatment catheter is then advanced up to the point at which the treatment procedure is to be implemented. The treatment catheter has for this purpose a passage beginning at its tip which extends over a certain portion or over the full length of the catheter and serves to receive the guidewire. This means that the proximal end of the guidewire needs to be inserted in the opening of this passage at the distal end of the catheter. Since the passage in the treatment catheter has an inner diameter which is only slightly greater than the outer diameter of the guidewire, insertion is difficult, it thereby needing to be taken into account that the complete treatment procedure is required to be implemented in as short a time as possible to reduce the stress on the patient.

[0003] An insertion aid of the type defined above is disclosed in EP-A-0 328 760. This insertion aid consists of two pieces. For applying these two pieces to a guidewire the operator needs two hands, and an additional ring is necessary for clamping the two pieces against each other. The two pieces have to be manufactured with closed tolerances in order to provide a smooth internal channel for the guidewire.

[0004] US-A-4 838 880 discloses an insertion aid comprising movable and stationary jaws operably and closably connected together by means of a thin hinge. This inserter can only be used together with a cup-like housing into which the converged or tapered end is to be inserted. Therefore, the inserter as such is not suitable for inserting the proximal end of a guidewire into the distal end of a catheter.

[0005] The invention is thus based on the object of defining an insertion aid of the kind as stated at the outset which is simple and cost-effective in manufacture, permitting introduction of the guidewire speedily and safely into the distal end of the catheter and which is subsequently easily removable from the guidewire.

[0006] This object is achieved according to the invention by defining an insertion aid comprising the features of claim 1.

[0007] In application of the insertion aid according to the invention the distal end of the catheter is insertable from one side into the passage formed between the clamping surfaces, the proximal end of the guidewire then being introduced from the other side into the passage which is flared funnel-shaped at both ends. In this way simple and speedy insertion of the guidewire into

the catheter is made possible. After the guidewire has been introduced into the catheter, the passage can be opened so that the insertion aid can be moved away laterally from the guidewire, the insertion aid thus no longer disturbing further treatment.

[0008] The invention will now be explained by way of an example with reference to the enclosed drawing in which:

10 Fig. 1 is an overall view of the insertion aid according to the invention,

15 Fig. 2 is a view of the internal surface of one of the two clamping pieces of the insertion aid of Fig. 1,

Fig. 3 is another such view as in Fig. 2 with a clamp spring inserted,

20 Fig. 4 is a section along the line B-B of Fig. 2 in the direction of the arrows 4, 4,

25 Fig. 5 is another such section as in Fig. 4, but along the arrows 5, 5 in Fig. 3,

Fig. 6 is a view of a spring means used in the insertion aid of Fig. 1,

30 Fig. 7 is a side view of the spring means of Fig. 6,

Fig. 8 is a side view of an insertion aid with the passage closed,

35 Fig. 9 is a side view of an insertion aid with the passage open,

Fig. 10 is a section of the insertion aid along the line A-A of Fig. 1 with the passage closed,

40 Fig. 11 is a section of the insertion aid along the line A-A of Fig. 1 with the passage open,

45 Fig. 12 is a view of the clamping surface of the clamping piece of Fig. 2 and Fig. 3 in which the depression provided in this clamping surface is evident,

50 Fig. 13 is a section along the line C-C of Fig. 2 and Fig. 3 to illustrate the position of the depression in the clamping surface,

[0009] The insertion aid 10 illustrated in Fig. 1 consists of two identical clamping pieces 12 which have a heart-shaped contour. Two of these clamping pieces 12 may be joined together like a clothes clamp. How and by what means this joining together is done is explained with reference to Figs. 2 and 3 which show the internal side of the clamping piece 12 facing away in Fig. 1.

Fig. 12

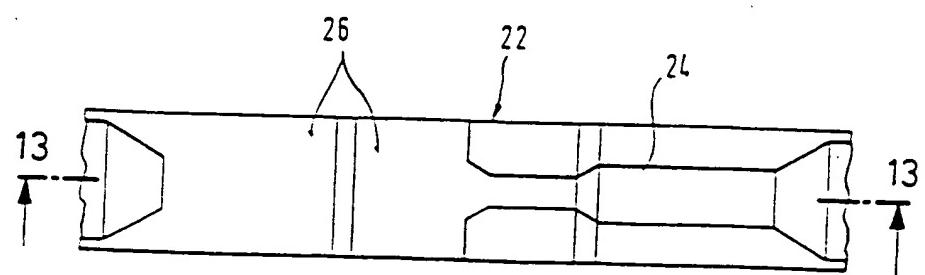
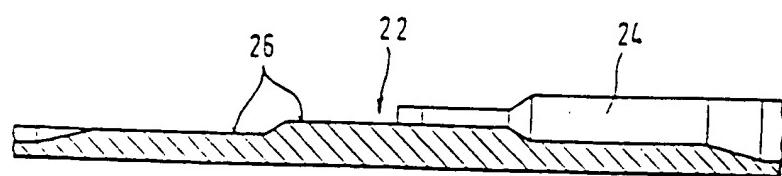


Fig. 13



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Fig. 3

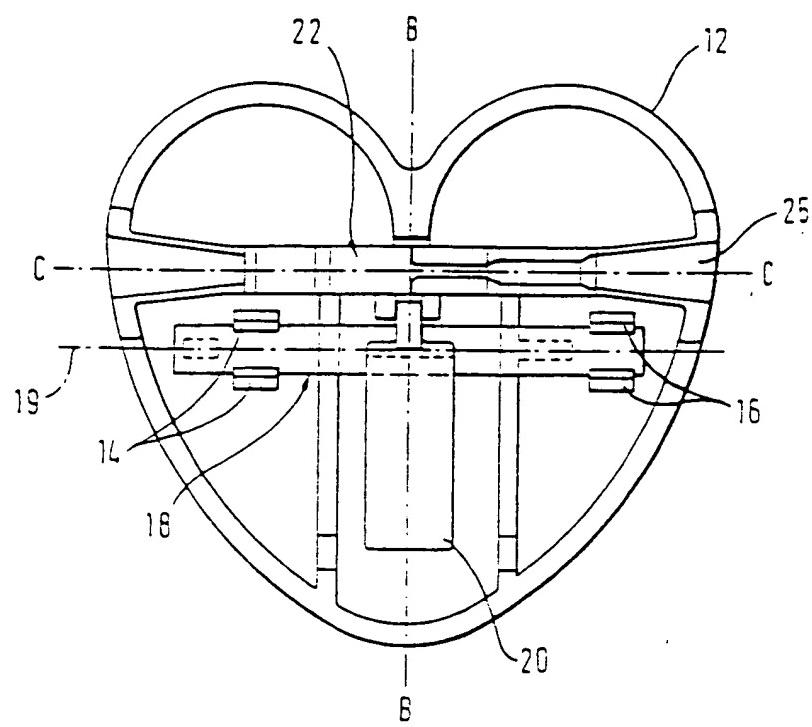


Fig.6

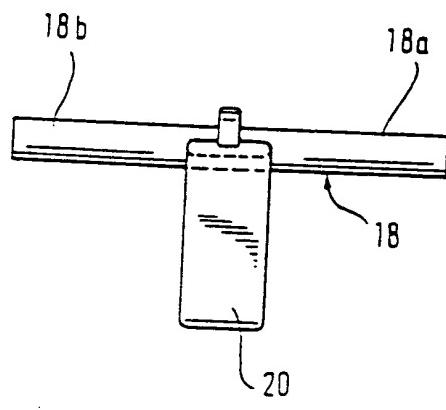


Fig.7

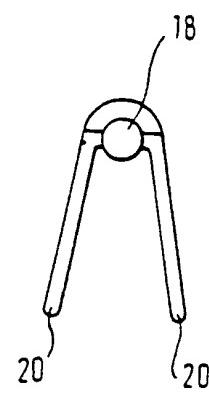


Fig. 2

Fig. 4

Fig. 5

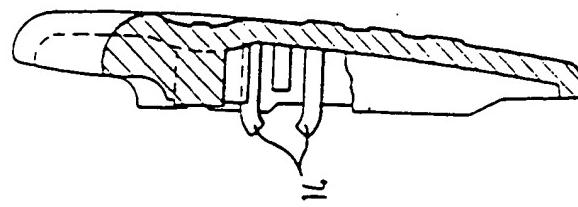
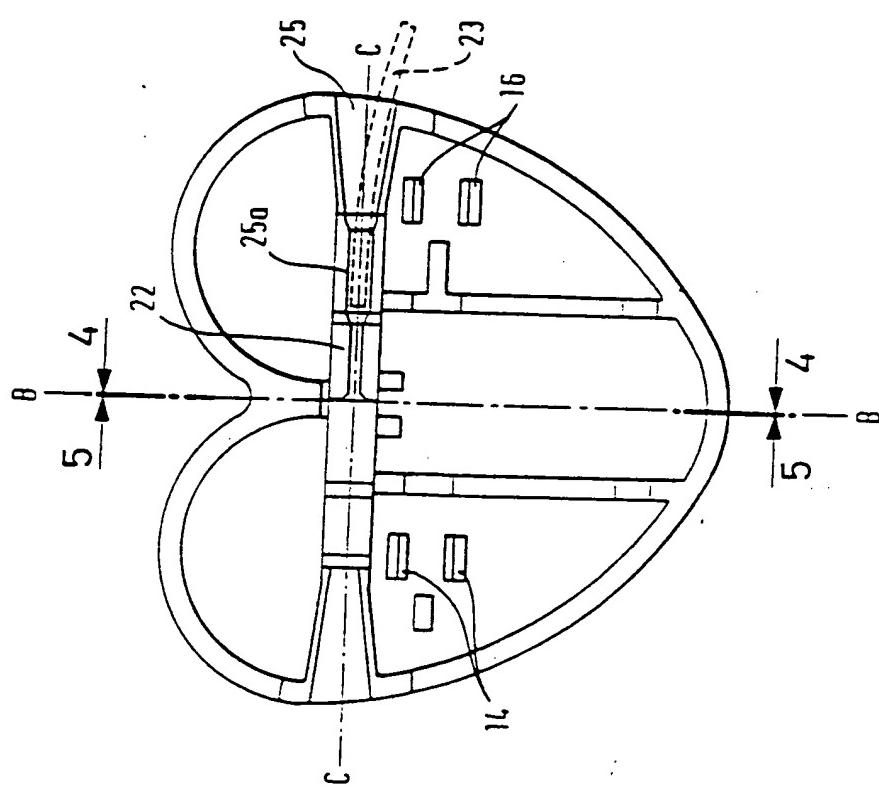


Fig. 8

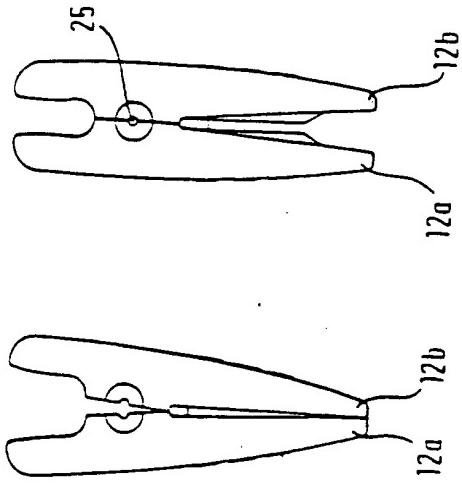


Fig. 1

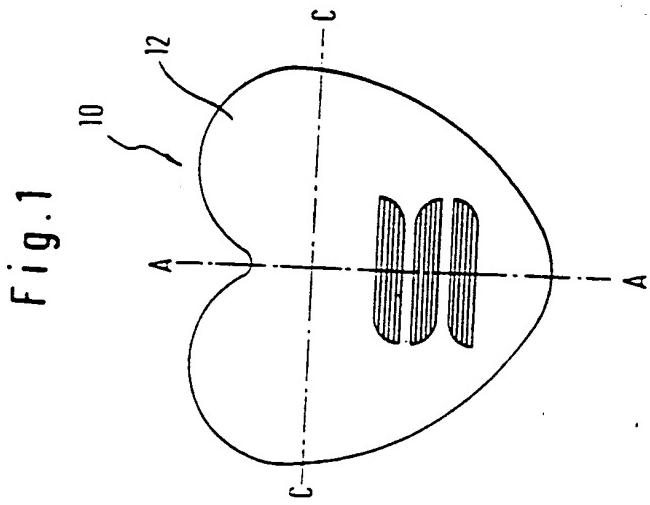


Fig. 10

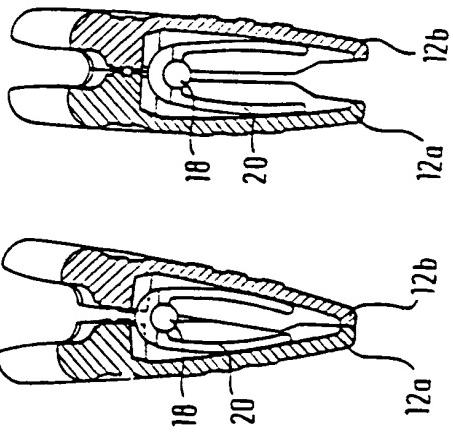


Fig. 11

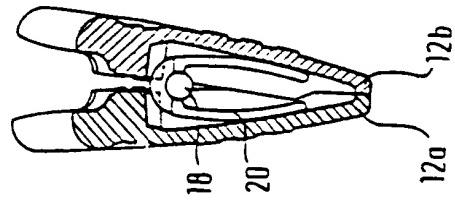


Fig. 10

[0010] In Fig. 2 gripping elements 14, 16 are provided on the internal surface which as shown by the section views of Figs. 4 and 5 each consist of two arcuate pieces between which a pin 18 may be pressed that carries in its middle portion a leaf spring 20. The combination of the pin 18 and the leaf spring 20 is illustrated in Fig. 6, the side view of Fig. 7 making it evident that the leaf spring 20 is configured U-shaped and is connected to the pin 18 in the region of its bend so that two sections 18a and 18b extend away from this bend.

[0011] From Fig. 2 it is evident that the gripping elements 14 and 16 are located differently spaced from the center axis B-B of the clamping piece 12. When in a clamping piece 12 as shown in Fig. 3 the pin 18 is inserted with the leaf spring 20 in the gripping elements 14 and 16, then a second clamping piece 12, as illustrated in Fig. 2, with its gripping elements 14 and 16 can also be pressed onto the pin 18, the gripping element 14 of the clamping piece 12 illustrated in Fig. 2 then being located to the left alongside the gripping elements 16 of the clamping piece of Fig. 3 on the pin 18, whilst the gripping elements 16 of the clamping piece 12 of Fig. 2 are located on the pin to the left alongside the gripping elements 14 of the clamping piece 12 illustrated in Fig. 3. In this way both clamping pieces 12 are fixedly latched to the pin 18 and the leaf spring 20, due to its U-shape thus acts against the clamping pieces 12 so that their ends located at the bottom in Figs. 2 and 3 are spread apart. In this arrangement the clamping pieces behave like two-armed levers, the pivot axis of which is formed by the axis 19 of the pin 18. They are movable between a closed clamp position and an open release position.

[0012] In the side view of Fig. 8 two clamping parts 12 connected to each other by latching on the pin 18 are illustrated in the clamp position in which the ends located at the bottom in Fig. 8 of the leaf spring 20 are spread apart, whereby to assist distinguishing the clamping parts are denoted 12a and 12b. When pressure is exerted on the sections of the clamping parts 12a and 12b located at the bottom against the force of the leaf spring the two clamping pieces 12a and 12b pivot into the release position illustrated in Fig. 9. Figs. 10 and 11 show the insertion aid 10 in the positions of Figs. 8 and 9, but each in sections along the line A-A of Fig. 1.

[0013] In Fig. 2 in a middle portion of the clamping piece 12 a clamping surface 22 is evident which is maintained in the clamping position of the insertion aid of Fig. 8 by the leaf spring 20 in contact with the corresponding clamping surface 22 of the other clamping piece 12. In the clamping surface 22 in the half located on the right in Fig. 2 a depression is provided which is flared funnel-shaped towards the end located on the right in Fig. 2 of the clamping surface 22. A magnified section of the clamping surface 22 with the depression 24 provided therein is illustrated in Fig. 12. Fig. 13 shows a section along the line 13-13 of Fig. 12, only the

section of the clamping piece 12 being illustrated in which the clamping surface 22 is located.

[0014] As is evident from Fig. 12 the depression 24 is flared in two steps funnel-like towards the end located on the right in Fig. 12. Due to this step-like flaring evident in Fig. 13 perpendicular to the longitudinal direction of the depression a flaring also results in this perpendicular direction. In the half shown on the left in Fig. 12 the clamping surface 22 has a non-recessed planar surface. In the middle portion this planar surface translates directly into the bottom of the first depression adjoining the middle on the right. This middle portion is followed by a further non-recessed portion of the clamping surface with a step transition.

[0015] In section 25a the passage 25 has an interior dimension corresponding to the outer diameter of the catheter into which the guidewire is to be introduced.

[0016] When two identical clamping pieces 12 are placed the one against the other by their internal surfaces the part shown on the right in Fig. 12 of the clamping surface locates on the side shown on the left in Fig. 12 of the clamping surface. This means that the depression 24 of the one clamping piece then constitutes an elongation of the depression 24 of the other clamping piece, they thus resulting in a continuous passage in the direction of the line 13-13 illustrated in Fig. 12. In this arrangement the planar surface 26 shown on the left in Fig. 12 of the clamping surface 22 forms practically the cover for the depression 24 in the other clamping surface. Accordingly, when the two clamping piece 12 are joined together a continuous passage open at both ends made up of two depressions 24 located in line materializes when the two clamping piece are urged by the leaf spring 20 as shown in Fig. 8 that their clamping surfaces are juxtaposed. When the insertion aid is brought into the release position shown in Fig. 9 by pressure being exerted on the sections located at the bottom in this Fig. of the clamping piece, the passage is opened towards the top in the arrangement of Fig. 9.

[0017] The insertion aid as described is put to use in practical application as follows:

[0018] When in treatment requiring the use of a catheter the guidewire is already inserted in the vessel to be treated, the proximal end of the guidewire then needs to be inserted into the distal end of the treatment catheter. To facilitate insertion the distal end of the treatment catheter is introduced as far as possible into the funnel-shaped flared end of the passage of the insertion aid. The proximal end of the guidewire is introduced into the other funnel-shaped flared end of the passage of the insertion aid until it penetrates the distal end of the treatment catheter. Due to the centered position of the distal end of the treatment catheter the guidewire can be introduced into the catheter with no appreciable difficulty so that no waste of time occurs in this phase of the treatment procedure. A treatment catheter 23 indicated by a dashed line in Fig. 2 is inserted into the passage 25 from the right. Its distal end is located in the portion 25a

in which the interior dimension of the passage roughly corresponds to the outer diameter of the catheter.

[0019] Once the guidewire has been introduced into the treatment catheter, the insertion aid is no longer required. By pressing the ends located at the bottom in Fig. 8 of the clamping piece the former are pivoted about the pin 18 against the action of the leaf spring into the position illustrated in Fig. 9 so that the passage originally closed in the clamping surface 22 is opened. The insertion aid can then be removed directly laterally from the treatment catheter and from the inserted guidewire. [0020] The clamping pieces may be manufactured cost-effectively as injection molded items since they are totally identical, thus requiring only a single injection mold. Due to the special position of the gripping elements 14, 16 and the configuration of the clamping surface 22 along with the depression 24 formed therein, the clamping piece are to be manufactured totally identical.

## Claims

1. An insertion aid to facilitate insertion of the proximal end of a guidewire into the distal end of a catheter comprising

two clamping pieces (12a, 12b) being arrangeable in a closed clamp position or in an open release position,

means (20) which maintain clamping surfaces (22), each of which is provided on one of each clamping piece, positively in contact with each other in the clamp position,

said clamping surfaces (22) in their condition in contact with each other defining a passage (25) open at both ends,

said passage (25) containing a section (25a) having an interior dimension suitable for accommodating a catheter and being flared funnel-shaped at both of its ends,

said clamping surfaces (22) in the release position laterally opening the passage (25) for removal of the guidewire, characterized in that

said clamping pieces (12a, 12b)

have the shape of a lever having two arms and

are hinged to each other for pivoting about a common axis between the closed clamp position and the open release position,

each of said clamping surfaces (22) is provided on one arm of each clamping piece (12a, 12b).

said means which maintain the clamping surfaces positively in contact with each other in the clamp position is a spring means (20),

said passage (25) is

oriented parallel to said common axis and formed by a depression (24) being provided in one half of each clamping surface (22),

the cross-section of said depression (24) corresponding to said passage (25) to be generated and the axial length of which corresponds to half of the length of said passage (25),

the plane of said clamping surface (22) coinciding in its middle portion of the half not provided with a depression with the bottom of the adjoining depression in the other half.

2. The insertion aid as set forth in claim 1 wherein said passage has a square cross-section.

3. The insertion aid as set forth in any of claims 1 or 2 wherein said spring means is a U-shaped bent leaf spring (20) along the bend line of which a pin (18) is provided which comprises two sections (18a, 18b) protruding from both sides of the leaf spring (20), wherein on the sides of said clamping pieces (12a, 12b) carrying said clamping surface (22) gripping elements (14, 16) are provided which are latching with said pin (18) such that said pin (18) forms the common pivot axis (C-C) of said clamping pieces (12) and wherein said leaf spring (20) is maintained tensioned between said two clamping pieces (12a, 12b), said leaf spring (20) in this position spreading apart two arms of said clamping pieces (12a, 12b) and thereby maintaining said clamping surfaces (22) in contact with each other.

4. The insertion aid set forth in any of claims 1 to 3 wherein said clamping pieces (12) are configured as identical injection molded parts.

## Patentansprüche

1. Einführungshilfe zum Erleichtern des Einführens des proximalen Endes eines Führungsdrahts in das distale Ende eines Katheters, mit

zwei Klammerstücken (12a, 12b), die in einer geschlossenen Klemmstellung oder in einer geöffneten Freigabestellung angeordnet sein

können.

Mitteln (20), die jeweils an einem der Klammerstücke angebrachte Klemmflächen (22) in der Klemmstellung kraftschlüssig in Anlage aneinander halten,

wobei die Klemmflächen (22) im aneinander anliegenden Zustand einen an beiden Enden offenen Kanal (25) begrenzen,

wobei der Kanal (25) einen Abschnitt (25a) mit einem zur Aufnahme eines Katheters geeigneten Innenmaß enthält und sich an seinen beiden Enden trichterartig erweitert,

wobei die Klemmflächen (22) in der Freigabestellung den Kanal (25) zur Entnahme des Führungsdrahts lateral öffnen, dadurch gekennzeichnet, daß

die Klammerstücke (12a, 12b)

die Form eines Hebeis mit zwei Armen haben und  
zum Kippen um eine gemeinsame Achse zwischen der geschlossenen Klemmstellung und der geöffneten Freigabestellung gelenkig miteinander verbunden sind,

wobei die Klemmflächen (22) jeweils an einem Arm jedes Klammerstücks (12a, 12b) angebracht sind,

wobei die Mittel, die die Klemmflächen in der Klemmstellung kraftschlüssig in Anlage aneinander halten, ein Federmittel (20) sind,

wobei der Kanal (25)

parallel zu der gemeinsamen Achse verläuft und

durch eine in einer Hälfte jeder Klemmfläche (22) angebrachte Vertiefung (24) gebildet ist,

wobei der Querschnitt der Vertiefung (24) dem zu erzeugenden Kanal (25) entspricht und deren axiale Länge der Hälfte der Länge des Kanals (25) entspricht,

wobei die Ebene der Klemmfläche (22) in ihrem Mittelbereich in der nicht mit einer Vertiefung versehenen Hälfte bündig mit dem Boden der angrenzenden Vertiefung in der anderen Hälfte verläuft.

2. Einführungshilfe nach Anspruch 1, bei welcher der Kanal einen quadratischen Querschnitt hat;

3. Einführungshilfe nach einem der Ansprüche 1 oder 2, bei welcher das Federmittel eine U-förmig gebogene Blattfeder (20) ist, längs deren Scheitellinie ein Stift (18) angebracht ist, der zwei beiderseits der Blattfeder (20) vorstehende Abschnitte (18a, 18b) aufweist, bei welcher an den die Klemmflächen (22) tragenden Seiten der Klammerstücke (12a, 12b) Greifelemente (14, 16) angebracht sind, die mit dem Stift (18) so in Rasteingriff bringbar sind, daß der Stift (18) die gemeinsame Kippachse (C-C) der Klammerstücke (12a, 12b) bildet und bei welcher die Blattfeder (20) zwischen den beiden Klammerstücken (12a, 12b) eingespannt gehalten wird, wobei die Blattfeder (20) in dieser Position zwei Arme der Klammerstücke (12a, 12b) auseinanderspreizt und dadurch die Klemmflächen (22) in Anlage aneinander hält.

4. Einführungshilfe nach einem der Ansprüche 1 bis 3, bei welcher die Klammerstücke (12) als identische Spritzgußteile ausgebildet sind.

#### 25 Revendications

1. Dispositif d'aide à l'insertion pour faciliter l'insertion de la partie extrême proximale d'un fil de guidage dans la partie extrême distale d'un cathéter, comprenant :

- deux pièces de serrage (12a, 12b) pouvant être disposées dans une position fermée de serrage ou dans une position ouverte de dégagement,
- des moyens (20) qui maintiennent des surfaces de serrage (22), chacune d'elles étant prévue sur chacune des pièces de serrage, positivement en contact l'une avec l'autre en position de serrage,

lesdites surfaces de serrage (22), lorsqu'elles sont en contact l'une avec l'autre, définissant un passage (25) ouvert aux deux extrémités,

l'édit passage (25) contenant une section (25a) ayant une dimension intérieure adéquate pour loger un cathéter, et étant évasé en forme d'entonnoir au niveau de ses deux extrémités,

lesdites surfaces de serrage (22), en position de dégagement, ouvrant latéralement le passage (25) pour enlever le fil de guidage, caractérisée en ce que

lesdites pièces de serrage (12a, 12b)

ont la forme d'un levier comprenant deux bras, et

sont articulées l'une par rapport à l'autre pour pivoter autour d'un axe commun entre la position fermée de serrage et la position ouverte de dégagement.

chacune desdites surfaces de serrage (22) est prévue sur un bras de chacune des pièces de serrage (12a, 12b).

lesdits moyens, qui maintiennent les surfaces de serrage positivement en contact l'une avec l'autre en position de serrage, sont des moyens formant ressort (20).

ledit passage (25) est

orienté de façon parallèle audit axe commun, et

formé par un creux (24) prévu dans une moitié de chacune des surfaces de serrage (22).

la section transversale dudit creux (24) correspondant audit passage (25) à réaliser, la longueur axiale dudit creux correspondant à la moitié de la longueur dudit passage (25).

le plan de ladite surface de serrage (22) coïncidant dans la partie médiane de sa moitié non dotée d'un creux, avec le fond du creux adjacent dans l'autre moitié.

2. Dispositif d'aide à l'insertion selon la revendication 1, où ledit passage a une section transversale carree.

3. Dispositif d'aide à l'insertion selon l'une quelconque des revendications 1 ou 2, dans lequel lesdits moyens formant ressort sont un ressort à lame (20) recourbé en forme de U, ligne de courbure le long de laquelle une goupille (18) est prévue qui comprend deux parties (18a, 18b) faisant saillie des deux côtés du ressort à lame (20), et dans lequel sur les côtés desdites pièces de serrage (12a, 12b) supportant ladite surface de serrage (22), des éléments de préhension (14, 16) sont prévus qui sont verrouillables avec ladite goupille (18), de façon que ladite goupille (18) forme l'axe pivot commun (C-C) desdites pièces de serrage (12), et dans laquelle ledit ressort à lame (20) est maintenu tendu entre lesdites deux pièces de serrage (12a, 12b), ledit ressort à lames (20), dans cette position, écartant les deux bras desdites pièces de serrage (12a, 12b) et, ce faisant, maintenant lesdites surfaces de serrage (22) en contact l'une avec l'autre.

4. Dispositif d'aide à l'insertion selon l'une quelconque des revendications 1 à 3, où lesdites pièces de serrage (12) sont configurées comme des pièces identiques moulées par injection.